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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/990,964	11/21/2001	Andrew Roman Chraplyvy	28-3-1-7	3319

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EXAMINER	
LEE, DAVID J	

ART UNIT	PAPER NUMBER
2613	

DATE MAILED: 09/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

SP

Office Action Summary	Application No.	Applicant(s)	
	09/990,964	CHRAPLYVY ET AL.	
	Examiner	Art Unit	
	David Lee	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 July 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4-13,15 and 16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4-13,15 and 16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 March 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 7, 8, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cao (US Patent No. 6,104,515) in view of Ramaswami (Optical Networks: A Practical Perspective)

Regarding claims 1 and 16, Cao teaches an apparatus adapted for use in an optical communication system, comprising: a modulator (fig. 1) for modulating an optical phase of pulses within a sequence of pulses (14 and 15 of fig. 1) in accordance with an input digital data stream to form an optical phase modulated signal in which each pulse in the sequence of pulses has associated with it an E-field value representing a phase (along 27 of fig. 1; see col. 5, line 65 to col. 6, line 25 for operation of modulator); and a means for applying the optical phase modulated signal to a dispersion managed optical transmission medium (28 of fig. 1). Cao does not expressly disclose that the pulse sequence is in RZ format, wherein for each bit interval, the E-field value starts and ends at zero, and the E-field value is positive or negative about the mid-point of the bit interval. However, utilizing an RZ format for pulses of this type is well known in transmission systems. For example, Ramaswami discusses various modulation schemes including those in RZ format (see pg. 178, section 4.1.1), wherein for each bit interval, the E-field value starts and ends at zero, and the E-field value is positive or negative about the mid-

point of the bit interval (see fig. 4.1, RZ format: notice that the E-field value starts and ends at zero according to the inputted binary data; the E-field value is positive at the mid-point). It would have been obvious to a skilled artisan at the time of invention to format the pulses into RZ in order to preserve pulse transitions and thereby decrease the need for a sensitive receiver.

Regarding claim 7, Cao teaches that the medium is a long haul transmission medium adapted for transmitting solitons (the medium is a fiber, which is adapted to transmit solitons).

Regarding claim 8, Cao teaches that the medium is adapted for transmitting pulses that disperse as they propagate along the medium (see 27, 28, and 29 of fig. 1).

Claims 10, 11, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cao in view of Ramaswami and in further view of Suzuki (US Patent No. 6,005,702)

Regarding claims 10 and 11, Cao does not expressly disclose that the modulator is a LiNbO3 modulator. However, LiNbO3 modulators are well known in the art. For example, Suzuki teaches a LiNbO3 phase modulator (col. 3, lines 64-65). It would have been obvious to one of ordinary skill in the art at the time of invention to use a LiNbO3 modulator as indicated by Suzuki in the system of Cao in order to have an effective and reliable modulation scheme.

Regarding claim 15, Cao does not expressly disclose that the transmission medium includes EDFA or Raman amplification. However, EDFAs are well known in the art and widely used in long haul transmission systems. For example, Suzuki teaches an EDFA for signal amplification (col. 4, lines 31-35). It would have been obvious to one of ordinary skill in the art at the time of invention to use an EDFA for amplification as indicated by Suzuki in the transmission medium of Cao in order to achieve a healthy and accurate signal.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cao in view of Ramaswami and in further view of Ono et al. (US Patent No. 6,097,525).

Regarding claim 4, the combined invention of Cao and Ramaswami teaches the limitations of claim 1 but does not expressly disclose that the modulator is a PSK modulator. However, PSK modulation schemes are well known in the art, as is disclosed and illustrated by Ono (col. 8, lines 2-8; fig. 12) and are one of a plurality of modulation formats available to an artisan. A skilled artisan would have been motivated to use a PSK modulator in order to take advantage of the superiority in noise-proof capabilities characterized in PSK schemes. Therefore it would have been obvious to a skilled artisan at the time of invention to use the PSK modulation technique of Ono in the system of Cao in order to allow transmission of healthier signals.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cao in view of Ramaswami and in further view of Miyamoto et al. (US Pub. No. 2003/0002121).

Regarding claim 5, the combined invention of Cao and Ramaswami teaches the limitations of claim 1 but does not expressly disclose that the modulator is a DPSK modulator. However, this type of modulation is well known in the art and is one of a plurality of modulation formats available to an artisan. For example, Miyamoto, from a similar field of endeavor, discloses an optical transmission system wherein the binary optical pulses are phase modulated using a DPSK format (Abstract; fig. 1). A skilled artisan would have been motivated to use the DPSK modulation scheme of Miyamoto in order to asynchronously detect the modulated data

transmitted from a transmitter during the data demodulation and to easily resolve phase ambiguities at a receiver, thereby simplifying the demodulation process. Therefore it would have been obvious to a skilled artisan at the time of invention to utilize DPSK modulation as indicated by Miyamoto in the system of Cao in order to have a simpler and cost-efficient receiver.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cao in view of Ramaswami and in further view of Tzukerman et al. (US Patent No. 6,724,829).

Regarding claim 6, the combined invention of Cao and Ramaswami teaches the limitations of claim 1 but does not expressly disclose that the modulator is a QPSK modulator. However, QPSK modulation is a modulation scheme well known in the art of data encoding and is one of a plurality of modulation formats available to an artisan. For example, Tzukerman discloses a QPSK modulator (314 of fig. 3, and col. 4, lines 56-57). It would have been obvious to one of ordinary skill in the art at the time of invention to incorporate a QPSK modulator as indicated by Tzukerman in the system of Cao because QPSK modulation has the advantages of high spectral efficiency and low bit error rate (col. 4, lines 56-61). Also, both the in-phase and the quadature portions of the carrier signal can be modulated and combined to form the QPSK signal.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cao in view of Ramaswami and in further view of Fukuchi (5,745,613).

Regarding claim 9, the combined invention of Cao and Ramswami teaches the limitations of claim 1 but does not expressly disclose that the transmitter further includes a WDM to combine an output signal of the modulator with other phase modulated signals having optical carriers with different wavelengths. However this structure is well known in the art. For example, Fukuchi teaches a WDM to combine an output signal of the modulator with other modulated signals having optical carriers with different wavelengths (see fig. 1). It would have been obvious to a skilled artisan at the time of invention to multiplex several modulated signals together as indicated by Fukuchi in order to efficiently utilize the bandwidth in the transmission in the system of Cao.

Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cao in view of Ramswami and in further view of Smith (US Patent No. 4,847,477).

Regarding claims 12 and 13, the combined invention of Cao and Ramswami teaches the limitations of claim 1 but does not expressly disclose that the receiver includes a delay demodulator or a balanced receiver for recovering the input data. Smith teaches a delay demodulator (fig. 3 – 18, and col. 4, line 21) and a balanced receiver for recovering said input data from said phase modulated signal (fig. 3 – 15, 25, and 22). One of ordinary skill in the art would have motivated to include these components of Smith in the receiver of Cao because balanced receivers eliminate relative intensity noise, canceling the intensity components of a laser, and delay demodulators delay signals so as to provide evaluation and combination of the output signal. Therefore, it would have been obvious to one of ordinary skill in the art at the

time of invention to include a balanced receiver and/or a delay modulator as indicated by Smith in the receiver of Cao.

2. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Lee whose telephone number is (571) 272-2220. The examiner can normally be reached on Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Vanderpuye can be reached on (571) 272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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KENNETH VANDERPUYE
SUPERVISORY PATENT EXAMINER